

Claims:

1. A stable phosphatidylserine (PS) composition of matter comprising from about 1 to about 99% (w/w) phosphatidylserine.
2. The composition of matter of claim 1, comprising from about 1 to about 99% (w/w) phosphatidylserine, from about 1 to about 99% (w/w) other functional ingredients, from about 1 to about 99% (w/w) phosphatidylcholine (PC), preferably from about 1 to about 99% (w/w) phosphatidylethanolamine (PE), from about 1 to about 99% (w/w) phosphatidylinositol (PI), from about 1 to about 99% (w/w) Omega-3 source, from about 1 to about 99% (w/w) Omega-6 source and/or from about 1 to about 99% (w/w) sterol or sterol esters.
3. The composition of matter of claim 1 or claim 2, characterized in that no more than about 1 to about 5% of the phosphatidylserine are decomposed after a storage period of at least 6 months, preferably at least 12 months, more preferably at least 24 months.
4. The composition of matter of any one of claim 1 to 3, characterized in being substantially devoid of phospholipase activity, particularly phospholipase D activity.
5. The phosphatidylserine composition of matter of any one of claims 1 to 4, being in powder form.
6. The phosphatidylserine composition of matter of any one of claims 1 to 5, wherein the phosphatidylserine is present in the form of a salt which is substantially soluble in organic solvents, preferably the sodium salt.
7. The phosphatidylserine composition of matter of claim 6, wherein

said PS sodium salt is obtained by treatment of a PS divalent salt with a metal chelator, preferably EDTA.

8. The phosphatidylserine composition of matter of any one of claims 1 to 5, wherein the phosphatidylserine is present in the form of a salt which is substantially non-soluble in organic solvents, preferably the calcium salt.

9. A stable liquid preparation of phosphatidylserine comprising the phosphatidylserine composition of matter of any one of claims 1 to 7, dissolved in oil, preferably a medium-chain triglyceride.

10. The liquid preparation of claim 9, comprising from about 1 to about 90% (w/w) phosphatidylserine, preferably from about 2.5 to about 55% (w/w).

11. The liquid phosphatidylserine preparation of claim 9 or claim 10, characterized in that no more than about 1 to about 5% of the phosphatidylserine are decomposed after a storage period of at least 6 months, preferably at least 12 months, more preferably at least 24 months.

12. The liquid phosphatidylserine preparation of any one of claims 9 to 11, further comprising additional bio-functional ingredients, preferably at least one of lecithin, phospholipids, vitamins, anti-oxidants, minerals, nutritional proteins or peptides, sterol and other derivatives, nutritional carbohydrates and their derivatives, amino acids, plant extracts, fermentation products, glyceride derivatives (mono- and di-glycerides), poly-unsaturated fatty acids, and Omega-3 and/or Omega-6 lipids.

13. A stable dispersion of phosphatidylserine comprising the stable

phosphatidylserine composition of matter of any one of claims 1 to 5 and 8, dispersed in a liquid base, preferably a lipid base, more preferably an oil base.

14. The phosphatidylserine dispersion of claim 11, comprising from about 1 to about 70% (w/w) phosphatidylserine, preferably from about 5% to 45% (w/w).

15. The phosphatidylserine dispersion of claim 13 or claim 14, wherein said oil base is a triglyceride base, particularly medium-chain triglyceride base or vegetable oil.

16. The phosphatidylserine dispersion of any one of claims 13 to 15, further comprising additional bio-functional ingredients, preferably at least one of lecithin, phospholipids, vitamins, anti-oxidants, minerals, nutritional proteins or peptides, sterol and other derivatives, nutritional carbohydrates and their derivatives, amino acids, plant extracts, fermentation products, glyceride derivatives (mono- and diglycerides), poly-unsaturated fatty acids, and Omega-3 and/or Omega-6 lipids.

17. The phosphatidylserine dispersion of any one of claims 13 to 16, characterized in that said dispersion is solid at room temperature and fluid at elevated temperatures, and it is suitable for softgel encapsulation.

18. The phosphatidylserine composition of matter of any one of claims 1 to 8, for use as a dietary supplement, nutraceutical food and/or drug additive.

19. The phosphatidylserine liquid preparation of any one of claims 9 to 12, for use as a dietary supplement, nutraceutical food and/or drug additive.

20. The phosphatidylserine dispersion of any one of claims 13 to 17, for use as a dietary supplement, nutraceutical food and/or drug additive.

21. A food article comprising the phosphatidylserine composition of matter of any one of claims 1 to 6, and optionally further comprising at least one additional active ingredient.

22. A food article comprising the phosphatidylserine liquid preparation of any one of claims 9 to 12, and optionally further comprising at least one additional active ingredient.

23. A food article comprising the phosphatidylserine dispersion of any one of claims 13 to 17, and optionally further comprising at least one additional active ingredient.

24. A pharmaceutical composition comprising the phosphatidylserine composition of matter of any one of claims 1 to 8, and optionally further comprising at least one additional bio-functional ingredient and/or at least one pharmaceutically acceptable additive, diluent, carrier or excipient.

25. A pharmaceutical composition comprising the phosphatidylserine liquid preparation of any one of claims 9 to 12, and optionally further comprising at least one additional bio-functional ingredient and/or at least one pharmaceutically acceptable additive, diluent, carrier or excipient.

26. A pharmaceutical composition comprising the phosphatidylserine dispersion of any one of claims 13 to 17, and optionally further comprising at least one additional bio-functional ingredient and/or at least one pharmaceutically acceptable additive, diluent, carrier or

excipient.

27. A capsule containing the phosphatidylserine composition of matter of any one of claims 1 to 8, wherein said capsule is preferably a soft gelatin capsule.

28. A capsule containing the liquid phosphatidylserine preparation of any one of claims 9 to 12, wherein said capsule is preferably a soft gelatin capsule.

29. A capsule containing the phosphatidylserine dispersion of any one of claims 13 to 17, wherein said capsule is preferably a soft gelatin capsule.

30. The phosphatidylserine composition of matter of any one of claims 1 to 8, for use as an enhancer of cognitive performance and learning ability.

31. The liquid phosphatidylserine preparation of any one of claims 9 to 12, for use as an enhancer of cognitive performance and learning ability.

32. The phosphatidylserine dispersion of any one of claims 13 to 17, for use as an enhancer of cognitive performance and learning ability.

33. The phosphatidylserine composition of matter of any one of claims 1 to 8, for use in preventing memory loss, particularly age-related memory loss.

34. The liquid phosphatidylserine preparation of any one of claims 9 to 12, for use in preventing memory loss, particularly age-related memory loss.

35. The phosphatidylserine dispersion of any one of claims 13 to 17, for use in preventing memory loss, particularly age-related memory loss.

36. A process for the preparation of a stable phosphatidylserine composition of matter, comprising the steps of:

- a. incubating an aqueous mixture of L-serine and optionally appropriate organic solvents with lecithin in the presence of an immobilized phospholipase D for a suitable period of time to give phosphatidylserine;
- b. removing the upper layer which contains the phosphatidylserine;
- c. obtaining the phosphatidylserine from the upper layer by standard means;
- d. washing the resulting phosphatidylserine with an appropriate aqueous solution to remove excess L-serine;
- e. optionally washing the phosphatidylserine obtained in step (d) with a suitable organic solvent, preferably ethanol at an elevated temperature; and
- f. drying the phosphatidylserine obtained in step (e).

37. The process of claim 36, further comprising the step of deactivating any residual phospholipase activity in the obtained phosphatidylserine by suitable means.

38. The process of claim 36 or claim 37, wherein said phospholipase is immobilized on an insoluble matrix and is optionally surfactant coated, and after step (a), the reaction mixture is allowed to stand until the phospholipase D precipitates.

39. A process for preparing a stable phosphatidylserine oil-based

liquid preparation of phosphatidylserine comprising the step of dissolving the phosphatidylserine composition of matter of any one of claims 1 to 7 or obtained by the method of any one of claims 36 to 38 in a suitable oil base, preferably a medium-chain triglycerides or vegetable oil.

40. A process for preparing a stable liquid-based dispersion of phosphatidylserine comprising the step of:

- dispersing the phosphatidylserine composition of matter of any one of claims 1 to 5 and 8, or obtained by the method of any one of claims 34 to 36, in a suitable liquid base, preferably triglyceride base and particularly medium-chain triglycerides or an edible oil, preferably fish oil.

41. A stable phosphatidylserine composition of matter whenever prepared by the process of any one of claims 36 to 38.

42. A stable phosphatidylserine composition of matter, which is resistant to degradation by at least one of the following routes: enzymatic hydrolysis and transphosphatidylation, partial or full hydrolysis of the phospholipid fatty acids, removal of the phosphate group, decarboxylation of L-serine carboxylate group, phospholipids hydroperoxidation, oxidation of the primary amine group of the L-Serine head-group.

43. A stable liquid phosphatidylserine preparation, which is resistant to degradation by at least one of the following routes: enzymatic hydrolysis and transphosphatidylation, partial or full hydrolysis of the phospholipid fatty acids, removal of the phosphate group, decarboxylation of L-serine carboxylate group, phospholipids hydroperoxidation, oxidation of the primary amine group of the L-Serine head-group.

44. A stable dispersion of phosphatidylserine, which is resistant to degradation by at least one of the following routes: enzymatic hydrolysis and transphosphatidylation, partial or full hydrolysis of the phospholipid fatty acids, removal of the phosphate group, decarboxylation of L-serine carboxylate group, phospholipids hydroperoxidation, oxidation of the primary amine group of the L-Serine head-group